CLAIMS

What is claimed is:

1. An apparatus comprising:

a die;

a package coupled to the die; and

an interposer, coupled to the package and formed from a circuit board substrate, by which the apparatus can be electrically coupled to a circuit board.

2. An apparatus as recited in claim 1, wherein the interposer comprises a first surface, a second surface, and a plurality of conductive paths between the first surface and the second surface.

3. An apparatus as recited in claim 2, wherein the interposer has an edge perpendicular to the first surface and the second surface, and wherein each of the conductive paths comprises a conductive coating formed in a recessed channel in the edge.

4. An apparatus as recited in claim 2, wherein each of the conductive paths comprises a solid conductive column formed through the substrate.

5. An apparatus as recited in claim 4, wherein each of the conductive columns has a composition of tin (Sn) and lead (Pb), comprising at least 81% lead (Pb).

6. An interposer, comprising a circuit board substrate, to couple a microelectronic device package to a circuit board.

7. An interposer as recited in claim 6, wherein the circuit board substrate has a first surface and a second surface parallel to the first surface, the interposer further comprising:

a first plurality of electrical contacts on the first surface;

a second plurality of electrical contacts on the second surface; and

a plurality of conductive paths, each from one of the first plurality of electrical contacts to one of the second plurality of electrical contacts.

8. An interposer as recited in claim 7, wherein the circuit board substrate further has an edge perpendicular to the first surface and the second surface, wherein each of the conductive paths comprises a conductive coating formed in a recessed channel in the edge.

9. An interposer as recited in claim 7, wherein each of the conductive paths comprises a solid conductive column through the circuit board substrate.

10. An interposer comprising:

a substrate having a first surface and a second surface;

a first plurality of conductive contacts on the first surface to be coupled to an electronic component package;

a second plurality of conductive contacts on the second surface to be coupled to a circuit board; and

a plurality of conductive paths, each separately connecting one of the first plurality of conductive contacts with one of the second plurality of conductive contacts.

11. An interposer as recited in claim 10, wherein the substrate is a circuit board substrate.

12. An interposer as recited in claim 10, wherein each of the conductive paths comprises a conductive coating formed in a recessed channel in an edge of the substrate, the edge perpendicular to the first surface and the second surface.

13. An interposer as recited in claim 12, wherein each of the recessed channels is a portion of a cylindrical through hole.

14. A device to couple an electronic component package to a circuit board, the device comprising a plurality of interposers coupled to each other, each being an interposer as recited in claim 13.

15. An interposer as recited in claim 14, wherein the plurality of interposers are coupled together to form an array of conductive paths to couple the electronic component package to the circuit board.

16. An interposer as recited in claim 10, wherein each of the conductive paths comprises a solid conductive column through the substrate from the first surface to the second surface.

17. An interposer as recited in claim 16, wherein each of the conductive columns is an alloy of tin (Sn) and lead (Pb), comprising at least 81% lead (Pb).

18. An electronic apparatus comprising:

a die having a plurality of electronic circuits formed thereon;

a package substrate having a first surface coupled to the die and a second surface;

a circuit board; and

an interposer coupled between the second surface of the package substrate and the circuit board, the interposer comprising

a circuit board substrate having a first surface and a second surface,

a first plurality of conductive contacts disposed on the first surface to be coupled to an electronic component package,

a second plurality of conductive contacts disposed on the second surface to be coupled to a circuit board, and

a plurality of conductive paths, each separately connecting one of the first plurality of conductive contacts with one of the second plurality of conductive contacts.

19. An electronic apparatus as recited in claim 18, wherein each of the conductive paths comprises a conductive coating formed in a recessed channel in an edge of the circuit board substrate, the edge perpendicular to the first surface and the second surface.

20. An electronic apparatus as recited in claim 19, wherein each of the recessed channels is a portion of a cylindrical through hole.

21. An electronic apparatus as recited in claim 18, wherein each of the conductive paths comprises a solid conductive column through the circuit board substrate from the first surface to the second surface.

22. An electronic apparatus as recited in claim 21, wherein each of the conductive columns has a composition of tin (Sn) and lead (Pb), comprising at least 81% lead (Pb).

23. A method of coupling an electronic circuit package to a circuit board, the method comprising:

coupling a plurality of electrical contacts on a first surface of an interposer to the electronic circuit package, the interposer formed from a circuit board substrate having the first surface, a second surface, and a plurality of conductive paths from the first surface to the second surface; and

coupling a plurality of electrical contacts on the second surface to the

circuit board.

24. A method as recited in claim 23, wherein the electronic circuit package includes a semiconductor die.

25. A method as recited in claim 24, wherein the circuit board is a motherboard.

26. An interposer comprising:

a circuit board substrate member having a first surface and a second surface parallel to each other, the substrate further having an edge perpendicular to the first surface and the second surface;

a first plurality of conductive contact pads on the first surface;

a second plurality of conductive contact pads on the second surface; and

a plurality of recessed channels in the edge of the substrate member, extending from the first surface to the second surface, each of the recessed channels having a conductive material therein to form a conductive path between one of the first plurality of contact pads and one of the second plurality of contact pads.

27. An interposer as recited in claim 26, wherein the recessed channels are concave.

28. An interposer as recited in claim 27, wherein each of the recessed channels is a portion of a though hole.

29. An interposer as recited in claim 26, further comprising a first plurality of grooves in the first surface between the contact pads on the first surface.

30. An interposer as recited in claim 29, further comprising a second plurality of grooves in the second surface between the contact pads on the second surface.

31. A device to couple an electronic component package to a circuit board, the device comprising a plurality of interposers coupled to each other, each being an interposer as recited in claim 26.

32. An interposer as recited in claim 31, wherein the plurality of interposers are coupled together to form an array of conductive paths to couple the electronic component package to the circuit board.

33. A method comprising:

creating a plurality of rows of via holes through a circuit board substrate from a first surface of the substrate to a second surface of the substrate, the first surface and the second surface being coated with a conductive material;

forming a conductive layer in each of the via holes to provide a conduction path through each of the via holes from the conductive material on the first surface to the conductive material on the second surface;

selectively removing some of the conductive material from the first surface and the second surface to form a plurality of traces on the first surface

and the second surface, each trace in electrical contact with the conductive layer in at least one of the via holes; and

severing the substrate to produce a plurality of individual substrate members, by cutting the substrate through the middle of the via holes in each row of via holes and between each row of via holes along a particular axis.

34. A method as recited in claim 33, further comprising forming grooves in the first surface and the second surface of the substrate between the via holes.

35. A method as recited in claim 33, wherein the conductive coating is a surface layer applied in each of the via holes.

36. A method as recited in claim 33, wherein said severing comprises severing the substrate to produce a plurality of elongate individual substrate members.

37. A method as recited in claim 36, further comprising affixing two or more of the plurality of individual substrate members together to form a substantially planar array.

38. A method as recited in claim 33, further comprising coupling the interposer between an electronic component package and a circuit board.

39. A method as recited in claim 38, wherein the electronic component package includes a semiconductor die, and wherein the circuit board is a motherboard.

40. An interposer comprising:

a circuit board substrate having a first surface and a second surface parallel to each other;

a first plurality of conductive contact pads on the first surface;

a second plurality of conductive contact pads on the second surface; and

a plurality of solid conductive columns through the substrate perpendicular to the first surface and the second surface, each in electrical contact with one of the first plurality of contact pads and one of the second plurality of contact pads.

41. An interposer as recited in claim 40, further comprising a first plurality of grooves in the first surface between the conductive columns on the first surface.

42. An interposer as recited in claim 41, further comprising a second plurality of grooves in the second surface between the conductive columns on the second surface.

43. An interposer as recited in claim 40, wherein the conductive material is an alloy of tin (Sn) and lead (Pb), comprising at least 81% lead (Pb).

44. A method of manufacturing an interposer, the method comprising:

creating a plurality of via holes through a circuit board substrate from a first surface of the substrate to a second surface of the substrate, the first surface

and the second surface being coated with a conductive material; and

creating a solid conductive column though each of the via holes, the conductive column forming an electrical path from the first surface to the second surface.

45. A method as recited in claim 44, further comprising selectively removing some of the conductive material from the first surface and the second surface to form a plurality of traces on the first surface and the second surface, each trace in electrical contact with the conductive column of one of the via holes.

46. A method as recited in claim 44, further comprising forming grooves in the first surface and the second surface of the substrate between the via holes.

47. A method as recited in claim 44, further comprising coupling the interposer between an electronic component package and a circuit board.

48. A method as recited in claim 47, wherein the electronic component package includes a semiconductor die and the circuit board is a motherboard.

49. A method as recited in claim 44, wherein each of the conductive columns has a composition of tin (Sn) and lead (Pb), comprising at least 81% lead (Pb).